

## ***Interactive comment on “Synoptic scale variability of surface winds and expected changes in the ocean–atmosphere dynamics of the eastern Austral Pacific Ocean” by Iván Pérez-Santos et al.***

### **Anonymous Referee #1**

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The presented study investigates the variability of southern hemisphere surface winds between 40°S and 56°S. As data basis two scatterometer datasets, Modis chlorophyll measurements, the ERA-Interim reanalysis dataset and observations from meteorological stations and buoys are used. A principal component analysis is applied on the scatterometer data to investigate the first three patterns. Up- and downwelling as well as nighttime heat wave events are investigated. The article is in principle well written. Jumping between the figures (e.g. line 214 fig. 4e than line 215 fig. 2c,f, line 217 fig. 3g,p) in the text makes it harder to follow the argumentation.

The topic of the study is interesting, and I suggest to publish the article after the

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following issues are addressed:

- What are the investigated “expected changes” which are mentioned in the title?
- Two different scatterometer datasets (QuickSCAT and ASCAT) are used, which have an overlap of only about two years. The raw satellite data are not gridded. Does the processing of the data can influence the results? Could you give some more details about the data?
- For QuickSCAT, the institution is mentioned from which the data were retrieved (could you change the link to the webpage/ftp where the data are available instead of the institute’s main page). It is not mentioned from where you get ASCAT. Are these data treated in the same way as the QuickSCAT data? If not, is there a potential impact on the results?
- In figure 6, a relatively strong difference in the Ekman pumping between both datasets can be seen. Is this because of the different periods of both data sets or are there differences in the observations? In line 169, it is mentioned that for the overlapping period,  $R^2$  0.7. Why wasn’t the EOF analysis done also with reanalysis data. This could help to identify the origin of the differences. ERA-Interim assimilates QuickSCAT. There is also a newer reanalysis called ERA5 available, which assimilates also ASCAT. With a resolution of about  $0.28^\circ$ , its resolution is close to the one from the gridded ASCAT data you are using.
- In figure 1, the long term mean for QuickSCAT is higher than for ASCAT. Is this because of the different periods, or has one instrument potentially a bias larger than the other? This could be checked by looking into a homogeneous data set like a reanalysis.
- In line 158 it is mentioned that long term means and linear trends were removed. How? Was it done for each scatterometer data set individually?

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- In line 161 it is explained that wavelet spectra were calculated on the entire sampling period. For each data set individually? How are the different resolutions taken into account? In the same way, wouldn't it make sense to repeat the same investigation with a reanalysis?
- You found different cycle lengths for 1999-2008 and 2008-2015. This corresponds more or less to the periods covered by the two scatterometer products. Does the same investigation on reanalysis data would give you comparable results? Or in other words, are the differences related to the two different satellite products and potentially different treatment of the data?
- What are the criteria to identify nighttime heat wave events? The temperature range of the events is specified. Is the definition for example based on the difference between night- and daytime, a heating rate, an exceedance of a threshold or is it only the existence of a second temperature peak at night time?
- The red dashed line in figure 3 (b,e,h,k,n,q) is the 95
- What do the flashes in figure 3 (c,f,l,o) mean ? This is not mentioned in the legend.
- Figure 4: Was ERA-Interim used for the EOF analysis? If this is the case, why are the results not compared to the ones from the observations? Both scatterometer data sets include the date which is shown in the figure.
- Figure 9: It is not explained what the error bars mean. Why is the lower bound not shown?

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